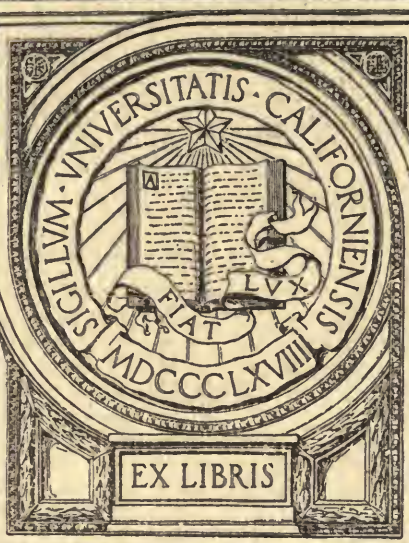
UC-NRLF
B 3 071 614

GIFT OF
U. S. govt.



~~Mskr Lib.~~
Agric. Dept.

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/volusiasiltloam00bonsrich

EXCHANGE

Issued February 10, 1912.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—CIRCULAR No. 55.

MILTON WHITNEY, Chief of Bureau.

UNIVERSITY OF CALIFORNIA

SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXX.

THE CHESTER LOAM.

BY

JAY A. BONSTEEL,

Scientist in Soil Survey.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1912.

BUREAU OF SOILS.

MILTON WHITNEY, *Chief of Bureau.*
ALBERT G. RICE, *Chief Clerk.*

SCIENTIFIC STAFF.

FRANK K. CAMERON, in charge of Physical and Chemical Investigations.
CURTIS F. MARBUT, in charge of Soil Survey.
OSWALD SCHREINER, in charge of Fertility Investigations.

SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXX.

THE CHESTER LOAM.

GEOGRAPHICAL DISTRIBUTION.

The Chester loam is the most important and widely distributed soil type of the northern Piedmont region. It is found principally in southeastern Pennsylvania, central Maryland, and north-central Virginia. Within this region a total area of 600,680 acres of the type has been encountered in eight different soil surveys. Its total extent is confined to an area lying between the James River on the south and the Delaware River on the extreme northeast. It is found only in the rolling Piedmont section within these limits.

CHARACTERISTICS OF SOIL AND SUBSOIL.

The surface soil of the Chester loam, to an average depth of about 10 inches, is prevalently a mellow, sometimes gritty, brown loam. The subsoil to a depth usually in excess of 36 inches is a brown, yellowish-brown, or reddish-yellow silty loam. At the greater depths this silty loam is frequently marked by the presence of partly decomposed rock fragments, giving it a somewhat sandy or gritty texture. From 3 feet to a depth of 15 or 20 feet this material grades into the partially decomposed rock from which both surface soil and subsoil have been derived. The depth of surface soil and subsoil over the partly decomposed rock varies considerably with the character of the surface of the areas where it is found. Upon all of the steeper slopes the surface layer of soil and subsoil is usually approximately 3 feet in depth. Upon the more level plateaulike stretches of the country occupied by the Chester loam the combined depth of surface soil and subsoil frequently reaches 20 or 25 feet before the underlying rock is encountered. In many areas, particularly upon the steeper slopes, fragments of the parent rock or of white flint may be found scattered through both surface soil and subsoil. In other localities, where erosion has been prevalent, there are frequently found large masses or even ledges of rock which outcrop through the soil and subsoil. These stony areas are usually of limited extent and are confined to the steeper slopes along the stream margins or to low ridges which intersect the general level of the type.

The surface soil is soft, mellow, friable, and in more southern areas somewhat sandy. The subsoil throughout the areas where the type has been encountered varies from a silty loam to a rather heavy loam. At greater depths, however, the presence of the partly decomposed rock gives excellent subsoil and underdrainage to the greater proportion of the type. It is only upon steeper slopes, where soil erosion has been active, that the coarser and more sandy material of the deeper subsoil is frequently encountered.

The Chester loam may be readily distinguished from the soils of the Cecil series, with which it is most frequently associated, through the fact that the subsoils of the various types of the Cecil series are invariably stiff, red sandy clays, while the subsoil of the Chester loam is a somewhat friable and silty brown, yellow, or reddish-yellow loam.

SURFACE FEATURES AND DRAINAGE.

The Chester loam occupies the rolling to somewhat hilly interior section of the northern Piedmont plateau. Within this region numerous rounded or flat-topped hills are separated by deep, crooked, gorgelike valleys. The type occupies the hilltops and slopes alike, varying considerably in the degree of its surface slope. The best agricultural areas are usually those which lie upon the nearly level tops of the hills or upon their slightly rounded shoulders.

Throughout the region where the Chester loam is found the natural drainage has been thoroughly established by the cutting of numerous minor and major stream channels. In consequence very few areas are poorly drained. It lies in a region where swamps are few or almost entirely absent. Upon all the steeper slopes there is liable to be some difficulty with excessive erosion, especially in the more southern areas of its occurrence, where the heavy rains frequently fall upon bare fields unprotected by grass or other vegetation. Areas of more gentle slope or those which are kept in sod either for pasturage purposes or for the cutting of hay suffer little from this cause.

The absolute elevation of the Chester loam above tide level varies considerably in the different areas where it has been encountered. The lower-lying areas in southeastern Pennsylvania and central Maryland frequently are found at altitudes ranging from 350 feet to 500 or 600 feet above tide level. Farther inland toward the western limits of its occurrence the altitudes range from 500 or 600 feet to as high as 1,100 feet above sea level.

LIMITATIONS IN USE.

The Chester loam is well fitted by its textural peculiarities, by its drainage features, and by its present agricultural condition for the production of a wide range of general farming crops and is also

fairly well suited to the production of special crops where the market demands for truck crops exist. It is probable that 75 per cent of the entire extent of the type which has thus far been encountered in the soil surveys can be used agriculturally in the manner described. The remaining 25 per cent of the type consists of the steeper slopes, the rougher areas, and those where residual bowlders or rock ledges obstruct tillage operations.

It is only upon the steeper slopes along the main drainage ways or within the foothill district of the Blue Ridge Mountains in central Virginia that erosion constitutes any serious problem in connection with the tillage of the Chester loam. Upon such steeply sloping areas it is frequently found necessary to maintain the slope in permanent pasture, or at least in mowing land, in order to prevent excessive washing of the soil. Where this has not been done the surface soil has frequently been bodily removed, and even the subsoil has been eroded until there remains only a shallow layer, consisting of about 2 feet of somewhat gritty and sandy loam, which rapidly grades down into the disintegrated underlying rock. Such areas have necessarily suffered greatly in their crop-producing power and in many instances have been thrown out of cultivation. They are frequently found growing up to second-growth hardwood timber.

Practically all other areas of the Chester loam are well farmed to a wide variety of staple crops, while certain special crops are grown in the vicinity of the larger cities or where transportation facilities to market are adequate.

IMPROVEMENT IN SOIL EFFICIENCY.

It is probable that the prevention of erosion upon the steeper slopes found within the area of the Chester loam would constitute the most necessary improvement in connection with increasing the efficiency of this soil. In nearly all of the more northern areas of its occurrence such slopes are either left in forest to supply fuel for the farm or else when cleared are maintained as far as possible in permanent pasture. This usually is sufficient to prevent the further encroachment of gullies and eroded areas upon the tilled fields.

Wherever this treatment has not been adopted on the steeper slopes within the Chester loam, erosion has become a serious problem. In some of the more southern areas where the type is encountered terracing and contour farming would tend to decrease the erosion upon its surface and in time would restore considerable tracts of this valuable type of soil to its earlier high crop-producing efficiency.

In connection with such methods for the prevention of erosion, a regular rotation of crops should be adopted which would permit the growing of mixed grasses for at least two years out of the four

or five years of a standard crop rotation. The Chester loam is well adapted to timothy, clover, and even bluegrass where it has been properly prepared, and the seeding down of permanent pasture is entirely feasible even upon some of the steeper slopes of the type.

In areas which have already been seriously eroded one of the first steps for improving the efficiency of this soil should be the incorporation of organic matter into the surface soil. This may best be accomplished by the plowing under of some green manuring crop, such as crimson clover or cowpeas. Before any of these leguminous crops are seeded upon the type it is found to be the best practice to apply either ground limestone at the rate of 3 to 5 tons per acre or slacked stone lime at the rate of approximately 1 ton per acre. The liming of the soil is necessary to secure a stand of clover, crimson clover, or cowpeas. Any of these crops may be turned under and incorporated with the surface soil for the restoration of organic matter.

Over by far the greater proportion of the Chester loam the organic-matter content of the surface soil is ordinarily satisfactory. This condition has been attained by growing a regular rotation of crops, including seeding down to grasses for a considerable period of time in each rotation. The grasses and other forage crops have also been fed to dairy animals or to beef stock for a long period of time, and it is a common practice to save carefully the stable manure resulting and to apply this to the land. The adoption of this practice is to be highly recommended, although in some areas it has not been done. Even upon fields in good condition it is also frequently found advisable to apply 1 ton per acre of the burned stone lime or 3 to 5 tons per acre of the ground limestone once in five or six years. The increase in the yields of clover, bluegrass, and even of timothy fully warrant the extension of this practice.

LIMITATIONS UPON SPECIAL CROPS.

The Chester loam, by its texture and inherent characteristics, is primarily a general-purpose farming soil, best suited to the production of corn, wheat, oats, grass, and potatoes.

In some localities, however, the type is used also for tomato production. In north-central Maryland, where many canning factories have been established, the tomato crop constitutes the principal special crop grown upon this soil. The tomatoes are grown under field conditions and yields ranging from 150 to 300 bushels per acre secured. The land, when prepared, is heavily manured, and the crop is grown in regular rotation with the more ordinary farm crops. Sweet corn for canning purposes is also grown to a limited extent in this same general locality.

Apples, pears, and peaches may be grown upon the Chester loam to good advantage in all of the more elevated areas. In southeastern Pennsylvania the York Imperial and Stayman Winesap are grown to perfection on this soil. In the more southern areas the Virginia Winesap is preferred. Some successful peach orchards have been established.

EXTENT OF OCCUPATION.

Throughout Pennsylvania and Maryland it is probable that 75 per cent of the entire area of the Chester loam is occupied for the production of crops or for permanent pasture. The balance of the type consists of the steeper slopes or small rocky areas that are topographically unsuited to agricultural occupation. Such areas are commonly in forest and constitute the farm woodlot. In the more southern areas in central and northern Virginia erosion has so seriously affected some areas of the Chester loam that not over 25 per cent of the type is now occupied for farming purposes, the remainder growing up to a sparse growth of hardwood timber. Considerable areas of this character could be reoccupied for agricultural purposes if proper precautions were taken to prevent excessive erosion.

CROP ADAPTATIONS.

It is probable that the largest area devoted to any single grain crop upon the Chester loam is given to corn growing. Throughout the region where this type occurs, corn produces from 40 to 60 bushels and in extreme cases as high as 100 bushels per acre. The variations in yield depend largely upon the care of the individual fields and upon the amount of attention given in the application of stable manure and commercial fertilizers to the soil. Wheat is commonly grown as the dominant small grain, yields ranging from 20 to 25 bushels in southeastern Pennsylvania, from 15 to 20 bushels in central Maryland, and from 12 to 18 bushels in the Virginia areas where the type has been encountered. To a minor degree also the yields vary with the amount of erosion which has been experienced over the surface of the soil. Rye is grown to a small extent, particularly in the southeastern Pennsylvania counties. Hay is one of the great crops upon the Chester loam, and it is probable that a larger area is devoted to the growing of grass than to that of all other crops combined. Timothy, redtop, red clover, and alsike clover all produce excellent yields upon this soil, and in the more southern areas the bluegrass also gives a good sod for permanent pasture. At the present time a large proportion of the hay produced upon this type is fed to dairy animals or to steers which are being fatted for market. There is, however, a considerable market for high-class hay pro-

duced upon the Chester loam. Potatoes are grown to a considerable extent in southeastern Pennsylvania, the average yield from this soil being between 100 and 125 bushels per acre. Many of the farmers elsewhere upon this type plant a few acres of potatoes annually, which are sold as the money crop from the farm.

The Chester loam is an important soil in the areas where it occurs for the maintenance of the dairy business. In southeastern Pennsylvania, owing to the proximity to large city markets, dairy products have largely replaced the fat steers and wheat, which formerly constituted the principal products of the areas where this type occurs. Milk is shipped principally to the wholesale markets in Philadelphia or to local creameries, depending upon transportation facilities. As a result a large proportion of the crops produced upon the type, aside from potatoes and wheat, is used for the feeding of dairy cattle. Nearly all of the corn grown, a large proportion of the hay, and practically all of the oat crop are either fed to the dairy herd or to the work animals upon the farm.

As a result of this system of farming large quantities of stable manure are produced upon each farm annually. This is carefully applied to the soil, usually to the ground which is being prepared for the corn or potato crops, in amounts ranging from 6 to 15 two-horse loads per acre. This preeminence of the dairy business and the consequent general use of stable manures accounts largely for the well-sustained organic matter content of the Chester loam and for its high crop-producing power. In addition to these large quantities of stable manure, acid phosphate, other forms of phosphoric acid, or the complete commercial fertilizers are used for the corn, wheat, and potato crop. The applications vary from 150 to 200 pounds per acre to as high as 800 and 1,000 pounds of such commercial fertilizer, the latter quantities being used in connection with the intensive cultivation of the potato crop.

FARM EQUIPMENT.

The ordinary farm equipment of the Chester loam is of a rather high grade. The buildings are well constructed and ample for the purposes of dairy or stock farming. Two and four horse teams are used both for the preparation of the land and for the cultivation of the crop and its harvesting. Plowing is ordinarily to a depth of 6 or 7 inches, although for the small-grain crops a less depth is frequent and is considered sufficient. Although orcharding is not an important business upon the Chester loam, nearly all of the farms upon this type maintain small orchards for the production of the household supply of fruit. In a few localities orchard planting has exceeded this limited amount.

SUMMARY.

The Chester loam is an important type of soil confined to the northern Piedmont region and occurring principally in southeastern Pennsylvania, central Maryland, and north-central Virginia.

The surface topography is rolling to somewhat hilly. It occupies the more rolling portion of the Piedmont Plateau and natural drainage is well established. Only limited areas are yet undrained.

In some localities excessive erosion has removed a considerable proportion of the surface soil and such areas, if they are again to be cultivated, should be carefully terraced and maintained in sod during a considerable portion of the crop rotation.

The Chester loam is an excellent general-purpose farming soil; the principal crops grown are corn, wheat, oats, rye, potatoes, and hay.

These crops form the basis of the dairy industry in southeastern Pennsylvania. Dairying and the production of beef cattle is also extensively practiced in Maryland and Virginia.

Tomatoes and Irish potatoes constitute practically the only special or money crops grown to any extent upon the Chester loam.

Apple orcharding has been undertaken to some extent. Peaches are also planted, giving fair yields of excellent fruit.

In Maryland and Pennsylvania at least 75 per cent of the entire area of this soil is occupied for agricultural purposes, the remainder consisting of woodlot and small patches of forest. In the more southern areas erosion has prevented the general occupation of the type and not more than 25 per cent is under tillage.

The equipment of buildings, teams, and tools upon the Chester loam is usually complete and well suited to the general farming purposes to which the type is devoted.

Approved.

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *December 20, 1911.*

UNI[illegible] LIBRARY

RETURN TO the circulation desk of any
University of California Library

or to the

NORTHERN REGIONAL LIBRARY FACILITY
Bldg. 400, Richmond Field Station
University of California
Richmond, CA 94804-4698

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS
2-month loans may be renewed by calling
(510) 642-6753
1-year loans may be recharged by bringing books to NRLF
Renewals and recharges may be made 4 days prior to due date

DUE AS STAMPED BELOW

MAR 21 1995

20,000 (4/94)

YC 67891